

REMARKS

The Examiner has rejected claims 1, 2, 4, 6, 9, 10, 17, 18, 21, 22, 24, 26, 30, 31, 33 and 34 under 35 U.S.C. 102(b) over U.S. patent 4,261,955 to Bailey, Jr. et al. It is respectfully submitted that the rejection has been overcome by the instant amendment. The claims have been amended to specify that the water vapor generator of the invention comprises a single chamber, wherein the size of the chamber determines the quantity of water available to the hydrogen gas generator. Unlike the cited references, the water vapor chamber of the claimed invention is not attached to an external water tank or reservoir that replenishes the available water in the water vapor chamber. Rather, there is a fixed amount of water loaded into the water chamber of the claimed invention, the water quantity being solely determined by the size of the water chamber, not by the available water supply. Accordingly, water within the chamber is gradually consumed as water vapor generates hydrogen gas, ultimately leading to complete water consumption. Support for this amendment can be found on page 5, lines 18-20 of the specification and in the Figures.

The invention claims an electrical power generator comprising:

- a) a water vapor generator; b) a hydrogen gas generator attached to the water vapor generator, said hydrogen generator containing a substantially non-fluid substance which reacts with water vapor to generate hydrogen gas; said hydrogen generator optionally being attached to said water vapor generator via at least one conduit; and
- c) a fuel cell attached to the hydrogen gas generator; said fuel cell optionally being attached to said hydrogen gas generator via at least one conduit; which water vapor generator comprises a single chamber, wherein the size of the chamber determines the quantity of water available to the hydrogen gas generator. The invention also provides a process for generating hydrogen gas for fueling a fuel cell using the electrical power generator of claim 1.

U.S. patent 4,261,955 to Bailey, Jr. et al. teaches a hydrogen generator. Similar to the claimed invention, the hydrogen generator of Bailey, Jr. also involves the contact of water vapor with a solid fuel to produce hydrogen gas. Unlike Applicant's claimed invention, Bailey, Jr. teach dual water chambers, **each being connected by a supply pipe to a water reservoir**. This external reservoir is used to regulate their hydrogen generation rate by the transfer of water between the water reservoir and their water chambers. As water flows to their water chamber from the external water reservoir, the level of water in the water chamber increases, which in turn increases the water vapor transfer, thus increasing the production of hydrogen. As the hydrogen gas is consumed, more water is pulled into the water chamber from the external reservoir.

The electrical power generator of the invention does not have a continuously replenishing water supply, but rather contains a fixed quantity of water, which quantity is determined by the size of the water vapor chamber. Further, the hydrogen generation rate of Applicant's power generator is controlled internally, such as with a valve, a pump, or other means, not externally as disclosed in Bailey, Jr. Accordingly, Applicant's power generator may be employed using water in the form of ice. This is not possible with the Bailey, Jr. generator which requires the water level in their water chamber to fluctuate. Accordingly, Applicant's power generator is not anticipated by the gas generator of the applied reference. For these reasons, it is respectfully submitted that the rejection has been overcome and should be withdrawn.

The Examiner has rejected claims 1, 4, 6, 9, 10, 11, 18, 21, 22, 26, 28, 30, 31, 33 and 34 under 35 U.S.C. 102(b) over U.S. patent 4,155,712 to Taschek. It is respectfully submitted that the rejection has been overcome by the instant amendment. Similar to Bailey, Jr., the water generating chamber of Taschek is connected to an external water reservoir that continuously regulates and replenishes the quantity of water in the water chamber. Taschek describes that water flows from water storage compartment 3b into water compartment 3a by a hose when the pressure in the fuel compartment is less than in water compartment 3a. Water vapor will then flow from water compartment 3a into the

fuel compartment at a rate proportional to the liquid water level in 3a, which is regulated by water reservoir 3b. Again, similar to Bailey, Jr., this precludes the use of ice as a form of water in the water chamber. As discussed above, the electrical power generator of the invention does not have a continuously replenishing water supply, but rather contains a fixed quantity of water, which quantity is determined by the size of the water vapor chamber. The water level inside Applicant's water vapor chamber does not fluctuate, and the water level inside the water vapor chamber does not regulate the performance of the power generator. For these reasons, it is submitted that the claims are not anticipated by Taschek. It is respectfully submitted that the rejection has been overcome and should be withdrawn.

The Examiner has rejected claims 12, 13 and 29 under 35 U.S.C. 103(a) over Taschek in view of U.S. patent 4,055,632 to Hoffman et al. It is respectfully submitted that the rejection has been overcome by the instant amendment. Hoffman et al. teaches a gas generator wherein a solid fuel, such as sodium borohydride, along with a catalyst, reacts with liquid water to generate hydrogen gas. The Examiner has cited Hoffman et al. in order to show that sodium borohydride may be used to generate hydrogen gas, and to show the presence of a reaction catalyst in generating hydrogen gas. The gas generator of Hoffman et al. differs from the presently claimed invention in that a metal hydride is reacted with *liquid water, not water vapor*, to generate hydrogen gas. Regardless, it is respectfully submitted that the disclosure of Hoffman et al. is insufficient to overcome the differences between the claimed invention and Taschek. Applicant respectfully asserts that a combination of Hoffman et al. and Taschek would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Taschek along with Hoffman et al. For these reasons it is requested that the rejection be withdrawn.

The Examiner has rejected claim 14 under 35 U.S.C. 103(a) over Taschek in view of Hoffman et al. and further in view of U.S. patent 6,358,488 to Suda. It is respectfully

submitted that the rejection has been overcome by the instant amendment. Suda describes a method for the generation of hydrogen gas by the reaction of a solid metal hydrogen complex compound in an aqueous alkaline solution, such as a 10% aqueous solution of sodium or potassium hydroxide, with a catalyst. The Examiner applies Suda to show that suitable catalysts include cobalt, nickel, ruthenium and alloys and combinations thereof. It is respectfully submitted that the disclosure of Suda and Hoffman et al. are insufficient to overcome the differences between the claimed invention and Taschek. Applicant respectfully asserts that a combination of Suda, Hoffman, et al. and Taschek would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Taschek along with Hoffman et al and Suda. For these reasons it is requested that the rejection be withdrawn.

The Examiner has rejected claims 7 and 8 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. pre-grant publication no. 2001/0022960 to Kojima et al. It is respectfully submitted that the rejection has been overcome by the instant amendment.

Kojima, et al. discloses a hydrogen generating method and apparatus where a complex metal hydride is hydrolyzed in the presence of liquid water and a catalyst. The Examiner has cited Kojima, et al. in order to show that the claimed power generator may further include an inert gas within its component chambers. It is respectfully submitted that the disclosure of Kojima, et al. is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al. Applicant respectfully asserts that a combination of Kojima, et al. and Bailey, Jr. et al. would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Bailey, Jr. et al. along with Kojima, et al. For these reasons it is requested that the rejection be withdrawn.

The Examiner has rejected claims 19, 20 and 32 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. patent 5,942,344 to Lehmeier et al. It is respectfully submitted that the rejection has been overcome by the instant amendment. Lehmeier et al. discloses a high-temperature fuel cell system having a heating element for heating a fuel cell. The Examiner has cited Lehmeier et al. to show that it would be obvious to include a heater with the claimed power generator to heat the fuel cell of the claimed invention. It is respectfully submitted that the disclosure of Lehmeier, et al., particularly the disclosure directed to heating a fuel cell, is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al. Applicant respectfully asserts that a combination of Lehmeier, et al. and Bailey, Jr. et al. would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Bailey, Jr. et al. along with Lehmeier, et al. For these reasons it is requested that the rejection be withdrawn.

The Examiner has rejected claims 3, 23, 25 and 35 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. patent 6,432,566 to Condit et al. It is respectfully submitted that the rejection has been overcome by the instant amendment.

Condit et al. teaches a direct antifreeze cooled fuel cell power plant that includes a thermal management system that directs the flow of a cooling fluid for controlling heat within the plant, including a direct antifreeze solution passing through a water transport plate. The Examiner points out that Condit discloses recycling product water from the fuel cell and/or directing cooling fluid within a coolant system as a vapor into the process oxidant and/or reducing fluid streams entering the fuel cell. Condit has absolutely nothing to do with the generation of hydrogen from a powdered fuel by reaction of the fuel with water vapor. There is simply nothing in Condit et al. that together with Bailey, Jr. et al. would teach or suggest an electrical power generator comprising: a) a water vapor generator; b) a hydrogen gas generator attached to the water vapor generator, said hydrogen generator containing a substantially non-fluid substance which reacts with

water vapor to generate hydrogen gas; said hydrogen generator optionally being attached to said water vapor generator via at least one conduit; c) a fuel cell attached to the hydrogen gas generator; said fuel cell optionally being attached to said hydrogen gas generator via at least one conduit; and d) a return line which directs residual water vapor and hydrogen gas from the fuel cell to the water vapor generator; which water vapor generator comprises a single chamber, wherein the size of the chamber determines the quantity of water available to the power generator.

The Examiner has cited Condit simply to show that it would be obvious to direct residual water vapor and residual hydrogen gas from the fuel cell back to the water vapor generator, such as via a return line from the fuel cell. However, it is respectfully submitted that the disclosure of Condit, et al. is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al. Applicant respectfully asserts that a combination of Condit, et al. and Bailey, Jr. et al. would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Bailey, Jr. et al. along with Condit, et al. For these reasons it is requested that the rejection be withdrawn.

The Examiner has rejected claims 15, 16 and 27 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. pre-grant publication no. 2001/0053469 to Kobayashi et al. It is respectfully submitted that the rejection has been overcome by the instant amendment.

The Examiner has cited Kobayashi et al. to show that it would be obvious for the claimed power generator to include a pump or a valve to regulate the passage of hydrogen gas and water vapor between the water vapor generator and the fuel cell. Kobayashi et al. teaches an apparatus for warming-up a fuel cell and further teaches a pump and a valve to circulate hydrogen gas throughout their system. It is respectfully submitted that the disclosure of Kobayashi, et al. is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al. Applicant respectfully asserts that a combination

of Kobayashi, et al. and Bailey, Jr. et al. would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Bailey, Jr. et al. along with Kobayashi, et al. For these reasons it is requested that the rejection be withdrawn.

With respect to each of the above rejections under 35 U.S.C. 103(a) it is respectfully submitted that the examiner is reconstructing the art in light of Applicant's disclosure. Where Applicants' teachings are needed to find the invention, the invention is not obvious. Obviousness cannot be determined solely after reading Applicants' teaching. Citing references that merely indicate that isolated parts recited in the claims are known is not a sufficient basis for a conclusion of obviousness; there must be something that suggests the desirability of combining the references in a manner calculated to arrive at the claimed invention. *Ex parte Hiyamizu*, 10 U.S.P.Q.2d 1393, 1394 (PTO Bd. Pat. Ap. and Int., 1988).

The point in time that is critical for an obviousness determination is at the time the invention. "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Obviousness cannot be established by hindsight combination to produce the claimed invention. *In re Gorman*, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). It is the prior art itself, and not the applicant's achievement, that must establish the obviousness of the combination. Further, the belief that one skilled in the art **could** form the claimed multilayered film does not suggest that one **should** form such a film to obtain the disclosed benefits.

Other than Bailey, Jr. et al. and Taschek, the references cited by the Examiner each certainly show the individual components, as well as one or more of the individual steps used in the instant processes. However, in forming the rejections, the Examiner then leaps to the conclusion that the formation of the claimed electrical power generator containing films is obvious. This is certainly not the case. The Examiner has failed to show the linchpin to connect the art and has failed to show a suggestion in the art rather than from an unsupported subjective conclusion, to form the claimed structure. The ancient argument that a building design is not obvious in view of a pile of bricks and mortar from which it is constructed, is equally applicable here.

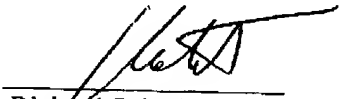
With regard to Bailey, Jr. et al. and Taschek in particular, it is again emphasized that the rejections have been overcome by the instant amendment. Unlike the cited references, the water vapor chamber of the claimed invention is not attached to an external water tank or reservoir that replenishes the available water in the water vapor chamber. Rather, there is a fixed amount of water loaded into the water chamber of the claimed invention, the water quantity being solely determined by the size of the water chamber, not by the available water supply. Accordingly, water within the chamber is gradually consumed as water vapor generates hydrogen gas, ultimately leading to complete water consumption. Neither of these references show a system having a fixed water supply, with the available quantity of water determined solely by the size of the water vapor chamber itself. This leads to the ultimate utility of the presently claimed invention as a source of electrical energy for powering miniature devices such as cellular phones or other hand held electronic devices, and ultimately larger scale systems such as fuel driven equipment and automobiles. These end uses are impossible with the power generators of the applied art. Additionally, due to the nature Bailey, Jr. et al. and Taschek, each of which require an external reservoir of water that alters the water level in their dual-chamber water system, it is impossible to use solid ice as a water source in a water vapor generator. Accordingly, it is respectfully asserted that each of the rejections have been overcome by

the instant amendment, and it is requested that each of the rejections be withdrawn.

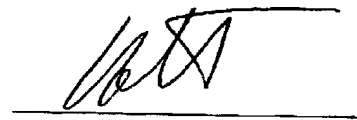
With regard to new claim 36, this represents former claim 5 in independent for, which was indicated to be allowable. New claim 37 requires a return line which is not shown in the prior art in a system where hydrogen gas is generated.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,


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I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office (FAX No. 703-872-9306) on May 12, 2004.


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